5-4 The student will demonstrate an understanding of properties of matter. (Physical Science)

Key Concepts
Matter: particles
States of Matter: physical properties including volume, shape, movement and spacing of particles
Mixtures: solutions, solute, solvent, concentration
Separating Mixtures: filtration, sifting, magnetic attraction, evaporation, chromatography, floatation
Rate of dissolving: temperature change, particle size, stirring
New substance: chemically combined, not easily separated
Pollution: water, air, soil, mixing and dissolving, foreign substances

Supporting Content Web Sites

Chem4Kids.com
http://www.chem4kids.com/files/matter_solid.html
The movement and spacing of particles in solids, liquids and gases is explained.
5-4.2

Chem4Kids.com
http://www.chem4kids.com/files/matter_liquid.html
Characteristics of liquids are discussed.
5-4.2

Chem4Kids.com
http://www.chem4kids.com/files/matter_gas.html
Characteristics of gases are discussed.
5-4.2

Chem4Kids.com
http://www.chem4kids.com/files/matter_mixture.html
Mixtures and solutions are discussed.
5-4.3

Chem4Kids.com
http://www.chem4kids.com/files/matter_solution.html
Solutes, solvents, and types of mixtures are discussed.
5-4.3, 5-4.5

Chem4Kids.com
http://www.chem4kids.com/files/matter_chemphys.html
Physical and chemical changes are explained, compared, and examples of each are given.
5-4.7

What is Water?
http://www.nyu.edu/pages/mathmol/textbook/slg.html
The three states of water, phase changes in water, and spacing of molecules in each phase are explained.
5-4.2

The Atom's Family – Phases of Matter
http://www.miamisci.org/af/sln/phases/nitrogengas.html
Students click on a thermometer to observe phase changes in water, copper, and nitrogen.
5-4.2

Suggested Literature

Baldwin, C. (2006). *Mixtures, Compounds & Solutions*. Illinois: Raintree.
ISBN 1-41091-677-4
Mixtures, compounds and solutions are explained and examples are given.
5-4.3, 5-4.7

Ballard, C. (2004). *Solids, Liquids, and Gases: From Ice Cubes to Bubbles*. Illinois: Heinemann Library.
ISBN 1-40340-955-2
The three states of matter are discussed and how they move and change. Solutions are explained.
5-4.1, 5-4.2

Snedden, R. (2001). *Separating Materials*. Illinois: Heinemann Library.
ISBN 1-58810-070-7
Compounds, mixtures, solutions, and sieves and filters are discussed.
5-4.3, 5-4.4, 5-4.7

Suggested Streamline Video

Properties of Matter, Part 2: Liquids, Solids and Gases
ETV Streamline SC
Students learn what matter is, characteristics and differences in the three states of matter including spacing of particles, phase changes of water, and a catchy song to help them remember important facts. Examples shown are excellent.
0:00 to 17:00
5-4.1, 5-4.2

Changes in the Properties of Matter: Physical and Chemical
Physical Changes
ETV Streamline SC
Physical changes, mixtures, separating mixtures, and solubility are explained. Many examples are shown.
11:47 to 18:30
5-4.3, 5-4.4

Changes in the Properties of Matter: Physical and Chemical
Chemical Changes
ETV Streamline SC
Chemical changes are explained and many examples are shown and discussed.
18:30 to 26:16
5-4.7

Common Properties of Matter: Atoms, Elements, and States
Segment 4: A Closer Look at the States of Matter
ETV Streamline SC
The physical properties of states of matter are explored including spacing of particles.
13:23 to 17:58
5-4.1, 5-4.2

Career Connections

Chemist
Chemists study the properties of matter. Matter can be referred to as chemicals. Everything is made of chemicals. Chemists find ways to make chemicals useful to us. They also try to improve things that people use daily, such as paint, medicines and cosmetics, as well as cars and airplanes. Chemists also search for new chemicals in nature. They search for ways to save energy and reduce pollution. Their research on living things helps doctors, farmers, and food preparers do their jobs better.

Materials Scientist
Matter can be referred to as chemicals. A materials scientist searches for and uses new knowledge about chemicals. Chemical research has led to the discovery and development of new and improved synthetic fibers, paints, adhesives, drugs, cosmetics, electronic components, lubricants, and thousands of other products.

Pharmacist
Pharmacists give medicine to people when a doctor says that they need it. Sometimes, pharmacists mix the medicine themselves. Most often, though, they use medicines that are already made. Pharmacists have to know the properties of the medicines they give out.